

AMENDMENTS TO THE CLAIMS

This claim listing replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A power steering system, comprising:

a torque sensor that is configured to sense a steering torque;

first and second passages, each including a pump-side portion and a cylinder-side portion;

a hydraulic cylinder with first and second chambers, the first and second chambers being connected to the first and second passages, respectively;

a hydraulic pump which is configured to supply and discharge ~~supplies and discharges~~ a hydraulic pressure to and from the first and second chambers of the hydraulic cylinder in accordance with the steering torque of the sensed by the torque sensor;

a drain passage connected to at least one of the first and second passages; and

a switching valve arranged at a connection of the drain passage and the at least one passage,

wherein when the hydraulic pump operates to discharge the hydraulic pressure to the at least one passage, the switching valve provides a providing ~~providing~~ fluid communication between the pump-side and cylinder-side portions of the at least one passage and ~~closing closes-off~~ the drain passage, and

wherein when the hydraulic pump stops, the switching valve provides a providing fluid communication between the cylinder-side portion of the at least one passage and the drain passage,

wherein the switching valve comprises a valve body formed with a plurality of passage holes communicating with the pump-side and cylinder-side portions of the at least one passage and the drain passage,

wherein a spool valve element is slidably arranged in the valve body and comprises a first valve portion for opening and closing the passage holes corresponding to the pump-side and cylinder-side portions and a second valve portion for opening and closing the passage hole corresponding to the drain passage, and

wherein a resilient member is configured to bias the spool valve element in the direction of closing-off a fluid communication between the pump-side and cylinder-side portions by the first valve portion and is configured to provide a fluid communication between the cylinder-side portion and the drain passage by the second valve portion.

2. (Canceled).

3. (Currently Amended) The power steering system as claimed in ~~claim 2~~ claim 1, wherein the first valve portion of the spool valve element is formed with an orifice for providing fluid communication between the pump-side and cylinder-side portions of the at least one passage.

4. (Currently Amended) The power steering system as claimed in ~~claim 2~~ claim 1, wherein the first valve portion of the spool valve element is formed with a recessed portion and a non-recessed portion on the side of the pump-side portion of the at least one passage, and

wherein when the hydraulic pump operates, the recessed portion provides fluid communication between the pump-side and cylinder-side portions of the at least one passage, and the non-recessed portion is held by the valve body of the switching valve.

5. (Currently Amended) The power steering system as claimed in ~~claim 2~~ claim 1, wherein the resilient member comprises a coil spring accommodated in a spring chamber formed in the switching valve at an end opposite to the pump-side portion of the at least one passage, and

wherein the spool valve element of the switching valve is formed with a communication passage for providing fluid communication between the cylinder-side portion of the at least one passage and the spring chamber.

6. (Currently Amended) The power steering system as claimed in ~~claim 2~~ claim 1, ~~further comprising~~ comprising:

a housing which accommodates the switching valve,

wherein the housing ~~is being~~ formed with a bottomed valve hole, and

wherein the valve hole ~~has having~~ an opening concealed with a cap.

7. (Original) The power steering system as claimed in claim 6, wherein the spool valve element comprises a restricting shaft arranged at an end on the side of the pump-side portion of the at least one passage,

wherein when the hydraulic pump stops to operate, the restricting shaft abuts on a bottom of the valve hole to restrict axial position of the spool valve element.

8. (Currently Amended) The power steering system as claimed in ~~claim 2~~ claim 1, wherein the switching valve is constructed such that when the hydraulic pump operates, the second valve portion ~~closes-off~~ closes-off the fluid communication between the cylinder-side portion of the at least one passage and the drain passage, and then the first valve portion provides communication between the pump-side and cylinder-side portions of the at least one passage.

9. (Currently Amended) The power steering system as claimed in claim 1, further ~~comprising~~ comprising:

a bypass passage arranged between the pump-side and cylinder-side portions of the at least one passage, the bypass passage bypassing the switching ~~valve~~, valve; and

a check valve provided to the bypass passage,

wherein the check valve allows ~~allowing~~ hydraulic fluid to flow from the cylinder-side portion to the pump-side portion only.

10. (Currently Amended) The power steering system as claimed in claim 9, further ~~comprising~~ comprising:

a negative-pressure check valve provided to the bypass passage at a position closer to the cylinder-side portion than the check valve,

wherein when the negative pressure occurs in the bypass passage, the negative-pressure check valve opens to supply hydraulic fluid to the pump-side portion.

11. (Currently Amended) The power steering system as claimed in claim 1, further ~~comprising~~ comprising:

a back-pressure regulating valve arranged downstream of the drain passage,

wherein the back-pressure regulating valve maintains ~~maintaining~~ the hydraulic pressure within a hydraulic circuit at a predetermined value.

12. (Original) The power steering system as claimed in claim 1, wherein the switching valve is provided to each of the first and second passages.

13. (Currently Amended) The power steering system as claimed in claim 12, further ~~comprising~~ comprising:

a first return passage which connects the drain passage connected to the switching valve of the first passage and the cylinder-side portion of the second ~~passage,~~ passage;

a second return passage which connects the drain passage connected to the switching valve of the second passage and the cylinder-side portion of the first ~~passage,~~ passage; and

first and second check valves provided to the first and second return passages, respectively,

wherein each check valve allows ~~allowing~~ hydraulic fluid to flow from the drain passage to the cylinder-side portion of the corresponding passage.

14. (Currently Amended) A power steering system, comprising:
- a torque sensor that senses a steering torque;
 - first and second passages, each including a pump-side portion and a cylinder-side portion;
 - a hydraulic cylinder with first and second chambers, the first and second chambers being connected to the first and second passages, respectively;
 - a hydraulic pump which ~~supplies and discharges~~ is configured to supply and discharge a hydraulic pressure to and from the first and second chambers of the hydraulic cylinder in accordance with ~~the steering torque of the~~ sensed by the torque sensor;
 - first and second drain passages connected to the first and second passages, respectively;
 - first and second switching valves arranged at connections of the first and second drain passages and the first and second passages, respectively, wherein:
 - when the hydraulic pump operates to discharge the hydraulic pressure to one of the first and second passages, the corresponding switching valve ~~providing~~ provides fluid communication between the pump-side and cylinder-side portions of the one passage and ~~closing off~~ closes-off the corresponding drain passage, and
 - when the hydraulic pump stops, the corresponding switching valve ~~providing~~ provides fluid communication between the cylinder-side portion of the one passage and the corresponding drain passage;
 - ~~a first and second back-pressure regulating valves~~ valve arranged downstream of the first and second drain passages, ~~the~~ respectively, ~~each~~ back-pressure regulating valve maintaining the hydraulic pressure within a hydraulic circuit at a predetermined value;
 - a first return passage which connects the first drain passage connected to the first switching valve and the cylinder-side portion of the second passage;
 - a second return passage which connects the second drain passage connected to the second switching valve and the cylinder-side portion of the first passage; and
 - first and second check valves provided to the first and second return passages, respectively, each check valve allowing hydraulic fluid to flow from the corresponding drain passage to the cylinder-side portion of the corresponding passage,

wherein the first switching valve comprises a first valve body formed with a first plurality of passage holes communicating with the pump-side and cylinder-side portions of the first drain passage and the first passage,

wherein the second switching valve comprises a second valve body formed with a second plurality of passage holes communicating with the pump-side and cylinder-side portions of the second drain passage and the second passage,

wherein a first spool valve element is slidably arranged in the first valve body and comprises a first valve portion for opening and closing the passage holes corresponding to the associated pump-side and cylinder-side portions and a second valve portion for opening and closing the associated passage hole corresponding to the first drain passage,

wherein a second spool valve element is slidably arranged in the second valve body and comprises a first valve portion for opening and closing the passage holes corresponding to the associated pump-side and cylinder-side portions and a second valve portion for opening and closing the associated passage hole corresponding to the second drain passage,

wherein a first resilient member is configured to bias the first spool valve element in the direction of closing-off a fluid communication between the associated pump-side and cylinder-side portions by the first valve portion and is configured to provide fluid communication between the associated cylinder-side portion and the first drain passage by the second valve portion, and

wherein a second resilient member is configured to bias the second spool valve element in the direction of closing-off a fluid communication between the associated pump-side and cylinder-side portions by the first valve portion and is configured to provide fluid communication between the associated cylinder-side portion and the second drain passage by the second valve portion.

15. (Currently Amended) A power steering system, comprising:
means for detecting and outputting ~~steering~~ a steering torque;
first and second passages, each including a pump-side portion and a cylinder-side portion;
a hydraulic cylinder with first and second chambers, the first and second chambers being connected to the first and second passages, respectively;
a hydraulic pump which ~~supplies and discharges~~ is configured to supply and discharge a hydraulic pressure to and from the first and second chambers of the hydraulic cylinder in accordance with ~~the steering torque of the detected and outputted by the~~ means for detecting and outputting steering torque;
a drain passage connected to at least one of the first and second passages; and
a switching valve arranged at a connection of the drain passage and the at least one passage,

wherein when the hydraulic pump operates to discharge the hydraulic pressure to the at least one passage, the switching valve ~~provides~~ providing fluid communication between the pump-side and cylinder-side portions of the at least one passage and ~~closing-off~~ closes-off the drain ~~passage, and~~ passage.

wherein when the hydraulic pump stops, the switching valve ~~provides~~ providing fluid communication between the cylinder-side portion of the at least one passage and the drain passage,

wherein the switching valve comprises a valve body formed with a plurality of passage holes communicating with the pump-side and cylinder-side portions of the at least one passage and the drain passage,

wherein a spool valve element is slidably arranged in the valve body and comprises a first valve portion for opening and closing the passage holes corresponding to the pump-side and cylinder-side portions and a second valve portion for opening and closing the passage hole corresponding to the drain passage, and

wherein a resilient member is configured to bias the spool valve element in the direction of closing-off a fluid communication between the pump-side and cylinder-side portions by the first valve portion and is configured to provide a fluid communication between the cylinder-side portion and the drain passage by the second valve portion.